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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/616,672	07/14/2000	Hiroyuki Saito	NE-1017-US/KM	6637

7590 11/19/2003  
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EXAMINER
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DUONG, FRANK

ART UNIT	PAPER NUMBER
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2666

DATE MAILED: 11/19/2003

3

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/616,672

Applicant(s)

SAITO, HIROYUKI

Examiner

Frank Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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### DETAILED ACTION

1. This Office Action is a response to the communication dated 07/14/2000. Claims 1-12 are pending in the application.

#### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

3. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-12 are rejected under 35 U.S.C. 102(a) as being anticipated by Saito et al (*Traffic Engineering using Multiple Multipoint-to-Point LSPs, IEEE, pages 894-901, 26-30 March 2000*) (hereinafter "Saito").

Regarding **claim 1**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes*

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*depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (see *connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), an apparatus (Fig. 5) for designing a plurality of communication paths between said ingress node and said egress node, the apparatus comprising (see *page 896, section D continues to page 899*):

means for defining an objective function for minimizing a number of candidate tree graphs for accommodating said communication graphs (*page 898, left column; equation (1)*);

means for defining a first constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

means for defining a second constraint equation for accommodating said communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

means for defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate said communication paths (*page 898, left column; equation (4)*); and

means for solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which said communication paths can be accommodated (*page 898, left column; equation (5)*).

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Regarding **claim 2**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), an apparatus (Fig. 5) for designing a plurality of communication paths between said ingress node and said egress node, the apparatus comprising (*see page 896, section D continues to page 899*):

means for storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

means for defining an objective function for minimizing a number of candidate tree graphs for accommodating one of communication paths which cannot be accommodated in said existing tree (page 898, left column; equation (1));

means for defining a first constraint equation for causing all of said candidate tree graphs to form a tree if all of said communication paths cannot be accommodated in said existing tree (*page 898, left column; equation (2)*);

means for defining a second constraint equation for accommodating said ones of communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

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means for defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate at least one of said communication paths (*page 898, left column; equation (4)*); and

means for solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which ones of said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 3**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), an apparatus (Fig. 5) for designing a plurality of communication paths between said ingress node and said egress node, the apparatus comprising (*see page 896, section D continues to page 899*):

means for defining a first constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

means for defining a second constraint equation for accommodating said communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

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means for embedding non-negative artificial variables into said first and second constraint equations (*page 898, left column; Variables*);

means for defining an objective function for minimizing a number of said non-negative artificial variables (*page 898, left column; equation (1)*); and

means for solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 4**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), an apparatus (Fig. 5) for designing a plurality of communication paths between said ingress node and said egress node, the apparatus comprising (*see page 896, section D continues to page 899*):

means for storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

means for defining a first constraint equation for accommodating ones of said communication paths which cannot be accommodated in said existing tree in one of said candidate tree graphs (*page 898, left column; equation (2)*);

means for defining a second constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (3)*);

means for embedding non-negative artificial variables into said first and second constraint equations (*page 898, left column; Variables*);

means for defining an objective function for minimizing a number of said non-negative artificial variables (*page 898, left column; equation (1)*);

means for solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said ones of communication paths can be accommodated.

Regarding **claim 5**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a method (Fig. 5) of designing a plurality of communication paths between said ingress node and said egress node, the method comprising (*see page 896, section D continues to page 899*):



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defining an objective function for minimizing a number of candidate tree graphs for accommodating said communication graphs (page 898, left column; equation (1));

defining a first constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

defining a second constraint equation for accommodating said communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate said communication paths (*page 898, left column; equation (4)*); and

solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 6**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a method (Fig. 5) of designing a plurality of communication paths between said ingress node and said egress node, the method comprising (*see page 896, section D continues to page 899*):

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storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

defining an objective function for minimizing a number of candidate tree graphs for accommodating ones of said communication graphs which cannot be accommodated in said existing tree (page 898, left column; equation (1));

defining a first constraint equation for causing all of said candidate tree graphs to form a tree if all of said communication paths cannot be accommodated in said existing tree (*page 898, left column; equation (2)*);

defining a second constraint equation for accommodating said ones of communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate at least one of said communication paths (*page 898, left column; equation (4)*); and

solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which said ones of said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 7**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes*

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*depicted in Fig. 1) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (see connection between core nodes depicted in Fig. 1) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (inherent in MPLS network), a method (Fig. 5) of designing a plurality of communication paths between said ingress node and said egress node, the method comprising (see page 896, section D continues to page 899):*

*defining a first constraint equation for causing all of said candidate tree graphs to form a tree (page 898, left column; equation (2));*

*defining a second constraint equation for accommodating said communication paths in one of said candidate tree graphs (page 898, left column; equation (3));*

*embedding non-negative artificial variables into said first and second constraint equations (page 898, left column; Variables);*

*defining an objective function for minimizing a total number of said non-negative artificial variables (page 898, left column; equation (1));*

*defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate said communication paths (page 898, left column; equation (4)); and*

*solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said communication paths can be accommodated (page 898, left column; equation (5)).*

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Regarding **claim 8**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a method (Fig. 5) of designing a plurality of communication paths between said ingress node and said egress node, the method comprising (*see page 896, section D continues to page 899*):

storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

defining a first constraint equation for accommodating ones of said communication paths which cannot be accommodated in said existing tree in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a second constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

embedding non-negative artificial variables into said first and second constraint equations (*page 898, left column; Variables*);

defining an objective function for minimizing a number of said non-negative artificial variables (*page 898, left column; equation (1)*);

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defining an objective function for minimizing a total number of said non-negative artificial variables (page 898, left column; equation (1)); and

solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said ones of communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 9**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a method (Fig. 5) of designing a plurality of communication paths between said ingress node and said egress node, the method comprising (*see page 896, section D continues to page 899*):

storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

defining an objective function for minimizing a number of candidate tree graphs for accommodating ones of said communication graphs which cannot be accommodated in said existing tree (page 898, left column; equation (1));

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defining a first constraint equation for causing all of said candidate tree graphs to form a tree if all of said communication paths cannot be accommodated in said existing tree (*page 898, left column; equation (2)*);

defining a second constraint equation for accommodating said ones of communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate at least one of said communication paths (*page 898, left column; equation (4)*); and

solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which said ones of said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 10**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a storage medium for storing an algorithm for operating a computer to design a plurality of communication paths between said ingress node and

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said egress node, said algorithm comprising (see *page 896, section D continues to page 899*):

storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system*.

See *page 896, right column, last two paragraphs*);

defining an objective function for minimizing a number of candidate tree graphs for accommodating ones of said communication graphs which cannot be accommodated in said existing tree (*page 898, left column; equation (1)*);

defining a first constraint equation for causing all of said candidate tree graphs to form a tree if all of said communication paths cannot be accommodated in said existing tree (*page 898, left column; equation (2)*);

defining a second constraint equation for accommodating said ones of communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate at least one of said communication paths (*page 898, left column; equation (4)*); and

solving a mathematical programming problem formed by said objective function, and said first, second and third constrain equations to obtain a plurality of trees in which said ones of said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 11**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a storage medium for storing an algorithm for operating a computer to design a plurality of communication paths between said ingress node and said egress node, said algorithm comprising (*see page 896, section D continues to page 899*):

defining a first constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

defining a second constraint equation for accommodating said communication paths in one of said candidate tree graphs (*page 898, left column; equation (3)*);

embedding non-negative artificial variables into said first and second constraint equations (*page 898, left column; Variables*);

defining an objective function for minimizing a total number of said non-negative artificial variables (*page 898, left column; equation (1)*);

defining a third constraint equation for determining whether each of said candidate tree graphs is used to accommodate said communication paths (*page 898, left column; equation (4)*); and



solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said communication paths can be accommodated (*page 898, left column; equation (5)*).

Regarding **claim 12**, in accordance with Saito reference, Saito discloses in a communication network (Fig. 1) comprising an ingress node (9, 8, 1 or 4), a plurality of core nodes (2, 3, 5, 6 and 7) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node (9, 8, 1 or 4), and an egress node (9, 8, 1 or 4) connected by links (*see connection between core nodes depicted in Fig. 1*) to the ingress node via the core nodes, said ingress node receiving communication traffic of the network and said egress node delivering communication traffic of the network (*inherent in MPLS network*), a storage medium for storing an algorithm for operating a computer to design a plurality of communication paths between said ingress node and said egress node, said algorithm comprising (*see page 896, section D continues to page 899*):

storing existing tree and determining whether said communication paths can be accommodated in said existing tree (*not shown; inherent in the edge-oriented system. See page 896, right column, last two paragraphs*);

defining a first constraint equation for accommodating ones of said communication paths which cannot be accommodated in said existing tree in one of said candidate tree graphs (*page 898, left column; equation (3)*);

defining a second constraint equation for causing all of said candidate tree graphs to form a tree (*page 898, left column; equation (2)*);

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embedding non-negative artificial variables into said first and second constraint equations (*page 898, left column; Variables*);

defining an objective function for minimizing a number of said non-negative artificial variables (*page 898, left column; equation (1)*);

defining an objective function for minimizing a total number of said non-negative artificial variables (*page 898, left column; equation (1)*); and

solving a mathematical programming problem formed by said objective function, and said first and second constrain equations to obtain a plurality of trees in which said ones of communication paths can be accommodated (*page 898, left column; equation (5)*).

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lee (USP 6,556,544).

Kodialam et al (USP 6,584,071).

Hsu (USP 6,363,319).

Kodialam et al (6,538,991).

Mauger (USP 6,522,627).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Duong whose telephone number is (703) 308-5428. The examiner can normally be reached on 7:00AM-3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (703) 308-5463. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

A handwritten signature in black ink, appearing to read 'Frank Duong', with a stylized, flowing script.

Frank Duong  
November 12, 2003